

Common GMAW problems – Causes & Remedies

1.0 COMMON GAS METAL ARC WELDING DEFECTS:

The process variables, materials or welding procedures can affect the weld quality. Some of the commonly observed defects in GMA welding and their possible remedies are tabulated below.

<i>Possible Causes</i>	<i>Corrective Actions</i>
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Weld metal cracks

1.	Too high a weld depth-to-width ratio.	<ul style="list-style-type: none"> • Increase the arc voltage or decrease the welding current.
2.	Too small a weld bead.	<ul style="list-style-type: none"> • Decrease the travel speed.
3.	Rapid cooling of the crater at the end of the weld.	<ul style="list-style-type: none"> • Fill craters adequately. • Use a back step welding technique at the end to complete the weld bead.

Inclusions

1.	Use of multiple pass, short circuiting type welding (slag).	<ul style="list-style-type: none"> • Clean the previous bead before making subsequent passes.
2.	High travel speeds (film type inclusions).	<ul style="list-style-type: none"> • Reduce the travel speed. • Increase the arc voltage.

Porosity

1.	Inadequate shielding of arc and weld pool.	<ul style="list-style-type: none"> • Increase the shielding gas flow. • Remove the spatter from the interior part of the nozzle. • Eliminate drafts (from fans, open doors etc.) blowing into the welding arc. • Reduce the travel speed. • Reduce the arc gap. • Hold the gun till the molten crater solidifies.
2.	Electrode contamination.	<ul style="list-style-type: none"> • Use clean and dry electrodes. • Eliminate contamination of electrode wire with any lubricant.
3.	Work-piece contamination.	<ul style="list-style-type: none"> • Remove oil, grease, rust, paints and dusts from the work surface prior to welding.

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4.	Arc voltage too high.	<ul style="list-style-type: none"> • Reduce the operating voltage.
5.	Excess nozzle-to-work distance.	<ul style="list-style-type: none"> • Reduce electrode extension.

Incomplete fusion

1.	Work-piece surface not clean.	<ul style="list-style-type: none"> • Clean all groove surfaces and weld zones.
2.	Insufficient heat input.	<ul style="list-style-type: none"> • Increase the electrode feed rate and the arc voltage. • Decrease the travel speed.
3.	Too large a weld puddle.	<ul style="list-style-type: none"> • Reduce arc weaving.
4.	Improper welding technique.	<ul style="list-style-type: none"> • Direct the electrode at the leading edge of the weld pool. • During weaving hold momentarily on the groove face.
5.	Improper joint design.	<ul style="list-style-type: none"> • Select proper groove design. • Maintain a proper groove angle to provide an easy access to electrode extension.

Lack of penetration

1.	Improper joint preparation.	<ul style="list-style-type: none"> • Provide/Increase root openings in butt-joint. • Decrease the height of root face. • Adequate access to maintain proper nozzle-to-work distance.
2.	Improper welding technique.	<ul style="list-style-type: none"> • Maintain the arc on the leading edge of the weld pool. • Select proper travel angle to achieve maximum penetration.
3.	Inadequate heat input.	<ul style="list-style-type: none"> • Increase electrode feed rate. • Maintain proper nozzle-to-work distance.

Excessive melt through

1.	Excessive heat input.	<ul style="list-style-type: none"> • Reduce the electrode feed rate & volt. • Increase the travel speed.
2.	Improper joint preparation.	<ul style="list-style-type: none"> • Reduce excessive root opening. • Increase the height of the root face.

